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On SHIPWRECKS in the ROYAL NAVY. By WILLIAM BARWICK HODGE, one of the Vice-Presidents of the Statistical Society.

[Read before the Statistical Society, 15th March, 1864.]

THE Tables appended to this paper have been drawn up for the purpose of showing the relative proportion of losses, arising from accidental causes only, among the vessels of the Royal Navy during war and during peace. The destruction or capture of vessels effected by enemies during war not being included.

The facts are taken from James's Naval History and a book upon Shipwrecks in the Royal Navy by Mr. W. S. Gilly.* Both these works are said by their authors to have been based upon information obtained from official documents, access to which was given to the writers by the Admiralty. The accuracy of James's work is so well established as to need no remark, and from a close examination of Mr. Gilly's book, I believe it to have been compiled with great care.

The Table I contains a statement of the average annual numbers of vessels employed as cruisers during the two wars consequent upon the first French revolution. The vessels are divided into four classes, namely:—1. Ships of the line carrying 60 guns and upwards. 2. Frigates carrying 28 guns or any higher number less than 60. 3. Smaller vessels carrying less than 28 guns. 4. Troop and store ships and other unarmed vessels. In order to restrict the number of classes, I have found it necessary to include among the frigates a class of vessels which do not come strictly within that denomination, although much smaller than many modern frigates. These are two-decked vessels, carrying from 50 to 60 guns, many of which were common in the Navy at the commencement of the war, but during the progress of it they gradually fell into disuse.

Table II contains a list of the annual losses, during the period in question, of vessels that foundered or were wrecked, or accidentally burned. The year 1802, which was a year of peace, is excluded from the comparison.

From these two tables it appears that, upon the average, during the years from 1793 to 1801, and 1803 to 1815, 93 line of battle ships, 124 frigates, and 281 smaller vessels, or 498 in all, were annually employed as cruisers, and that during the 22 years referred to, 28 line of battle ships, 76 frigates, and 248 smaller vessels, were accidentally destroyed, independently of the vessels lost in action.

* London : Parker, 1857.

The average annual percentage of loss upon the average number of each class employed, was as follows :

	Ships of the Line.	Frigates.	Smaller Vessels.	Total of all Classes.
	Per cent.	Per cent.	Per cent.	Per cent.
Wrecked	0·88	2·57	3·07	2·54
Foundered	0·15	0·15	0·87	0·55
Burnt	0·34	0·07	0·07	0·12
Total	1·37	2·79	4·01	3·21

The total annual rates per cent. upon the several classes were in the proportion of 1, 2, and 3, very nearly the proportion of losses among frigates being a little more than twice, and among the smaller classes not quite three times as great as among ships of the line. The risk of destruction by fire was very nearly five times as great in ships of the line as in smaller vessels.

Of the total number of vessels lost—

278	or	79·0	per cent.	were wrecked.
61	„	17·3	„	foundered.
13	„	3·7	„	were burned.
<hr/>				
In all	352		100·0	

In 1802, a year of peace, three sail only (one frigate and two smaller vessels) were lost, out of the average number of 352 vessels employed, being at the rate of 0·85 per cent. per annum.

According to the best estimate that can be framed, the 352 vessels referred to in Table II, had on board at the time they were lost crews amounting in the aggregate to 50,186 men, of whom 14,311 perished. This is in the proportion of 28½ per cent.

A valuable comparison of the losses in this respect in the Royal, with those of the same kind in the Mercantile, Navy may be obtained from a paper upon Marine Assurance, dated May, 1852, published by Mr. William Lance, of Lloyd's, in the Assurance Magazine.* Mr. Lance estimated that out of the crews of 4,737 vessels wrecked, numbering in all 38,627 men, 10,368 were drowned. This was at the rate of 26·84 per cent., a ratio approximating very nearly to the proportion of deaths in the Royal Navy. It might have been expected that the ratio of deaths in the latter would have been smaller, considering the superior construction of the vessels, the greater number of boats supplied to them, and the more perfect

discipline of the men; but in a ship of war the number of the crew is very much greater in proportion to the size of the vessel than in the mercantile marine, and this in the former service must necessarily increase the difficulty of saving life in the event of a wreck.

In a paper on the "Mortality arising from Naval Operations," which I had the honour to lay before the Society,* I endeavoured to estimate the loss of life in the Navy from shipwreck during the period under consideration, and calculated it at 13,621 men. On going over the facts again, I have added to the list several cases of wreck which I had not previously noticed, and these have raised the number of men lost to 14,311. I have also corrected the dates of several wrecks which has caused an alteration in the distribution of the numbers of the annual losses as well as in the aggregate number.

The annual deaths from shipwreck in the Royal Navy during war appear to have been at the rate of 6 per 1,000 of the mean number of men employed. This was double the ratio of deaths from injuries received in battle, which was only 3 per 1,000 annually.

The following statement shows—

The Proportion of the Crews lost in	Ships of the Line.	Frigates.	Smaller Vessels.	Total of all Classes.
	Per cent.	Per cent.	Per cent.	Per cent.
Vessels wrecked	38·43	8·30	19·30	19·29
„ foundered	66·90	44·26	85·87	75·66
„ burnt	31·36	98·26	24·71	37·08
„ lost from all causes }	39·25	12·56	35·71	28·51

The men serving on board frigates seem to have incurred less risk, or to have had peculiar means of safety, as the proportion of loss among them was only one-third of the proportion lost on other vessels.

The distribution of the total loss of men is as follows:—

7,440	or	52·00	per cent.	were lost in vessels wrecked.
5,032	„	35·20	„	„ that foundered.
1,839	„	12·80	„	„ burnt.
In all 14,311		100·00		

In order to determine the effect of the seasons upon the prevalence of wrecks, I have drawn out the following statement in which, the numbers being insufficient for a monthly enumeration, I have

* *Statistical Journal*, vol. xviii, p. 217.

given those occurring in each quarter of the year, beginning with the second in order to bring the summer and winter quarters together. It comprises the whole of the ships lost during the period referred to in Table II, with the exception of 1 ship of the line and 22 smaller vessels, in relation to which the exact dates of loss cannot be ascertained.

Months.	Vessels Lost.							
	Numbers of			Total of all Classes.	Percentage of			Total of all Classes.
	Ships of the Line.	Frigates.	Smaller Vessels.		Ships of the Line.	Frigates.	Smaller Vessels.	
April, May, June.	3	11	32	46	15·0	14·9	14·4	14·6
July, Aug., Sept.	—	20	44	64	—	27·0	19·8	20·3
Oct., Nov., Dec.	11	24	79	114	55·0	32·4	35·6	36·0
Jan., Feb., March.	6	19	67	92	30·0	25·7	30·2	29·1
	20	74	222	316	100·0	100·0	100·0	100·0

Table III contains an enumeration of the vessels lost to the Royal Navy from the close of the year 1815 to that of 1857. The numbers are so small that an annual statement of them would be useless, and I have therefore thrown them into groups of seven years each, and I have adopted these periods because some of them coincide with the periods for which statistical reports as to the health and mortality of the Navy have been published.

In the 42 years comprised in the Table III, 75 vessels only were lost, being at the rate of 1·8 per annum. This is little more than one-tenth of the average number (rather more than 16) annually lost in the 22 years comprised in Table II. The 42 years were principally years of peace, and did not lead to any warlike operations of importance, except during the Russian War (1854 to 1856). Only two ships employed in the operations against the Russians were wrecked, and the period of seven years in which the war took place shows a smaller loss, both of ships and men, than any other in the table. This, considering the much larger number of vessels employed, is very remarkable.

I have not been able to ascertain the average number of the vessels employed, except for three of the periods comprised in Table III. From 1816 to 1822, the average number was 138, and of these 17 were lost, being at the rate of 1·76 per cent. per annum. From 1830 to 1836, an average number of 248 vessels was employed, and of these 10, being at the rate of 0·58 per cent. per annum, were lost.

From 1837 to 1843, an average of 262 vessels was employed, and of these 10, being at the rate of 0·545 per cent. per annum, were lost. The three periods may be considered as giving a fair example of the average losses during peace, which for the whole 21 years were at the rate of 0·815 per cent. per annum, as compared with 3·21 per cent. per annum during war, being in the ratio of 1 to 4 very nearly.

The aggregate crews of the 75 vessels referred to in Table III, amounted to 7,312 men, and of these 1,900 perished. This is at the rate of 25·99 per cent., being almost identical with the proportion of loss in the mercantile marine already noticed, and which, it was observed, approximated very nearly to the rate of loss in the Royal Navy during war. It seems, therefore, to be the result of rather an extensive experience, that the loss of a vessel is attended, upon the average, with the loss of about one-fourth of her crew.

An examination of Table III shows a constant diminution in the losses of vessels from accidental causes in the period from 1815 to 1857. In the years 1856 and 1857 one ship only was lost, and as the average number of vessels employed during those years was 202, the annual ratio of loss was 0·248, or a small fraction under a quarter per cent, and less than one-seventh of the average annual ratio, 1·76 per cent. for the period, 1816-22.

This diminution is no doubt due in an important degree to the application of the auxiliary power of steam; but much of it may be attributed to scientific improvements in navigation and in the construction of our ships. A short time before the peace of 1815, the system of diagonal bracing, which added so greatly to the strength of the vessels, was, with other improvements, introduced into the navy by Sir Robert Seppings. His account of it was published in the "Philosophical Transactions" for 1814, but many years would of course elapse before it could be completely adopted. It is strange that there should have been so much delay in applying to ship building a principle founded upon simple and well-known properties of the triangle and parallelogram, and practised from time immemorial in land carpentry; the employment of it for the navy having, it is said, been suggested to Sir Robert Seppings by his observation of the gate commonly used in the country.*

* The principle of construction, generally adopted in this country about the year 1851, in consequence of the extraordinary success of the United States yacht "America" in that year, of lengthening the bow and carrying the greatest breadth of beam further aft, which has wonderfully improved the sailing qualities of our ships, is not a recent discovery. It appears to have been well known to the French naval architects in the last century. The frigate "Endymion" was built upon this principle, in imitation of a vessel captured from the French in 1794. She turned out one of the fastest vessels in the service, and by her superior sailing secured the capture of the American frigate "President," which would have escaped the squadron that took her, had she not been overtaken and brought to

Towards the end of the last century, many vessels were lost from the practice of coppering ships captured from the French. That nation, as they did not sheathe their ships with copper, made very general use of iron bolts for fastenings. The galvanic action set up by the contact of the two metals, the nature of which was not then understood, although its effects had been previously observed, caused such a rapid corrosion of the iron, that many of the vessels some-time after being coppered, were found to be falling to pieces. This fact was mentioned to me by Mr. Knowles, the learned author of a valuable "Inquiry into the Means taken for Preserving the Navy" (London, 1821), and it was probably in a great measure the cause of the remarkable result mentioned by James ("Naval History," vol. iii, p. 358), that of twenty-two vessels of the Royal Navy that foundered between the years 1793 and 1801, fourteen were of foreign build, an enormous proportion considering the small number of foreign-built vessels that is likely to have been employed.

In a "Discourse of Trade to the East Indies" (London, 1621), written by Thomas Mun, "famous in his time among merchants," is recorded the following statement of the casualties among shipping two centuries and a half ago:—

"Of 79 ships sent out" (to the East Indies) "before the month of July, 1620, 34 had come home in safetie, 4 have been worn out by long service, 2 were overwhelmed in the trimming there, 6 have been cast away by the peril of the seas, 12 have been surprised" (whether by pirates or public enemies is not stated) "and 21 ships still remained."

The following is the proportion of casualties among the vessels of which the fates were ascertained:—

38	or	65'50	per cent.	returned in safety.
8	"	13'80	"	were lost.
12	"	20'70	"	were captured.
<hr/> 58		<hr/> 100'00		

These figures do not give us the true average ratios of casualties, as in order to determine them it would be necessary to know the number of voyages performed and the time the ships were employed.

action by the "Endymion." Notwithstanding this evidence of the value of the principle, it seems to have been subsequently entirely neglected by our naval authorities.

TABLE I.—Showing the Average Numbers of Vessels Employed

Year.	Ships of the Line.			Frigates.			Smaller Armed	
	Ships.	Guns.	Tonnage.	Ships.	Guns.	Tonnage.	Ships.	Guns.
1793	55	4,247	93,104	80	2,821	63,388	71	1,053
'94	88	6,750	147,881	118	4,217	95,702	96	1,430
'95	98	7,568	165,900	133	4,830	111,909	120	1,795
1796	106	8,168	179,566	138	4,990	118,006	144	2,177
'97	106	8,077	177,684	138	4,971	119,352	182	2,666
'98	104	7,988	178,018	132	4,821	117,214	223	3,195
'99	103	7,847	176,505	128	4,691	115,546	238	3,422
1800	100	7,662	172,177	130	4,785	119,475	240	3,457
1801	102	7,851	177,476	132	4,871	123,051	227	3,260
'02	—*	—	—	—	—	—	—	—
'03	54	4,097	95,233	89	3,279	82,962	140	2,118
'04	79	6,173	142,297	108	3,957	99,696	228	3,248
'05	93	7,286	166,952	122	4,459	113,241	297	4,109
1806	104	7,986	182,823	132	4,805	122,357	342	4,746
'07	108	8,209	189,010	136	4,935	125,868	369	5,171
'08	113	8,579	198,531	138	5,019	128,590	400	5,673
'09	111	8,460	196,363	144	5,240	135,609	419	5,946
'10	108	8,265	192,978	145	5,299	138,998	389	5,538
1811	105	8,061	189,290	136	4,970	131,811	361	5,155
'12	102	7,889	185,862	123	4,505	120,292	352	5,079
'13	100	7,747	183,467	124	4,597	124,849	358	5,238
'14	73	5,563	132,968	118	4,462	122,598	326	4,875
'15	38	2,925	70,596	80	3,058	83,652	218	3,344
Annual average	93	7,154	163,395	124	4,527	114,280	261	3,759
*Year of Peace, 1802	68	5,183	118,360	105	3,868	98,639	157	2,313

as Cruisers in the Royal Navy in each Year from 1793 to 1815.

Vessels.		Troop and Store Ships, &c.		Total of all Classes.			Estimated Average Numbers of Men and Officers Employed.	Year.
Tonnage.	Ships.	Tonnage.	Ships.	Guns.	Tonnage.			
20,774	—	—	206	8,121	177,266	43,000	1793	
28,912	—	—	302	12,397	272,495	80,000	'94	
35,082	—	—	351	14,193	312,891	94,000	'95	
42,359	—	—	388	15,335	339,931	105,000	1796	
51,795	—	—	426	15,714	348,831	114,000	'97	
61,230	—	—	459	16,004	356,462	115,000	'98	
64,798	—	—	469	15,960	356,849	115,000	'99	
65,379	—	—	470	15,904	357,031	107,000	1800	
61,385	—	—	461	15,982	361,903	127,000	1801	
—	—	—	—	—	—	—	'02*	
44,128	30	23,196	313	9,494	245,519	80,000	'03	
66,290	37	24,100	452	13,378	332,383	97,000	'04	
79,060	31	16,630	543	15,854	375,883	115,000	'05	
90,954	29	14,952	607	17,537	411,086	115,000	1806	
100,601	27	15,656	640	18,315	431,135	124,000	'07	
112,396	25	16,535	676	19,271	456,052	125,000	'08	
119,010	27	18,014	701	19,646	468,996	125,000	'09	
110,780	33	23,320	675	19,102	466,076	137,000	'10	
103,487	38	27,964	640	18,186	452,552	139,000	1811	
102,888	40	29,908	617	17,473	438,950	137,000	'12	
106,140	46	34,842	628	17,577	449,298	138,000	'13	
100,707	48	36,411	565	14,900	392,684	111,000	'14	
72,034	36	27,621	372	9,327	253,903	81,000	'15	
74,554	20	14,052	498	15,440	366,281	110,180	Annual average	
43,953	22	8,683	352	11,364	269,635	—	*Year of Peace, 1802	

TABLE II.—*Showing the Numbers of Ships of the Royal Navy Accidentally in Action not*

Years.	Ships of the Line.				Frigates.			
	Total Numbers of				Total Numbers of			
	Vessels.	Guns.	Crews.	Men Lost.	Vessels.	Guns.	Crews.	Men Lost.
1793	1	74	531	—	—	—	—	—
'94	1	64	450	450	2	60	413	—
'95	2	172	1,215	11	2	82	514	—
1796	3	228	1,717	444	8	308	1,880	432
'97	1	64	441	—	6	210	1,373	213
'98	1	74	576	—	6	214	1,379	261
'99	2	162	1,110	291	5	172	1,128	270
1800	3	248	1,746	597	1	36	244	—
1801	1	74	477	400	5	182	1,127	—
'02	*—	—	—	—	—	—	—	—
'03	1	64	442	442	5	168	1,171	—
'04	2	148	981	25	5	194	1,246	71
'05	—	—	—	—	2	80	502	2
1806	2	138	927	353	—	—	—	—
'07	2	148	1,071	781	6	224	1,462	428
'08	—	—	—	—	6	204	1,370	240
'09	1	64	442	—	2	64	422	—
'10	1	74	576	360	3	106	678	11
1811	3	246	1,729	1,718	5	182	1,256	253
'12	—	—	—	—	4	136	886	13
'13	1	74	531	—	1	38	284	—
'14	—	—	—	—	—	—	—	—
'15	—	—	—	—	2	74	540	50
	28	2,116	14,962	5,872	76	2,734	17,875	2,244
Vessels—								
Wrecked...	18	1,330	9,351	3,594	70	2,496	16,449	1,365
Foundered	3	212	1,459	976	4	162	967	428
Burnt.....	7	574	4,152	1,302	2	76	459	451
	28	2,116	14,962	5,872	76	2,734	17,875	2,244
*Year of Peace, 1802 ... }	—	—	—	—	1	50	310	—

Lost in each Year from 1793 to 1815. (N.B.—Vessels Captured or Destroyed Included.)

Smaller Vessels.				Total of all Classes.				Years,
Total Numbers of				Total Numbers of				
Vessels.	Guns.	Crews.	Men Lost.	Vessels.	Guns.	Crews.	Men Lost.	
3	12	135	10	4	86	666	10	1793
5	70	472	109	8	194	1,335	559	'94
4	48	346	123	8	302	2,075	134	'95
11	138	898	388	22	674	4,495	1,264	1796
9	122	716	491	16	396	2,530	704	'97
7	92	631	35	14	380	2,586	296	'98
10	146	975	208	17	480	3,213	769	'99
13	174	1,121	623	17	458	3,111	1,220	1800
10	142	813	228	16	398	2,417	628	1801
7	98	609	128	13	330	2,222	570	'02*
15	116	898	7	22	458	3,125	103	'03
14	166	965	281	16	246	1,467	283	'04
11	162	954	676	13	300	1,881	1,029	'05
25	264	1,478	732	33	636	4,011	1,941	1806
23	282	635	200	29	486	2,005	440	'07
16	206	1,127	592	19	334	1,991	592	'08
10	112	557	144	14	292	1,811	515	'09
9	80	509	77	17	508	3,494	2,048	'10
16	186	965	328	20	322	1,851	341	1811
12	192	1,139	138	14	304	1,954	138	'12
15	172	1,111	574	15	172	1,111	574	'13
3	48	295	103	5	122	835	153	'14
248	3,028	17,349	6,195	352	7,878	50,186	14,311	'15
190	2,228	12,776	2,481	278	6,054	38,576	7,440	Vessels— Wrecked Foundered Burnt
54	734	4,225	3,628	61	1,108	6,651	5,032	
4	66	348	86	13	716	4,959	1,839	
248	3,028	17,349	6,195	352	7,878	50,186	14,311	
2	32	249	109	3	82	559	109	{ *Year of Peace, 1802

TABLE III.—*Showing the Number of Vessels of the Royal Navy Lost from 1816 to 1857 Inclusive.*

Years inclusive.	Ships of the Line.	Frigates.				Smaller Vessels.				Total of both Classes.			
		Vessels.	Guns.	Crews.	Men Lost.	Vessels.	Guns.	Crews.	Men Lost.	Vessels.	Guns.	Crews.	Men Lost.
1816-22	None	3	114	874	—	14	188	1,294	265	17	302	2,168	265
'23-29	—	1	48	275	—	24	247	1,622	884	25	295	1,897	884
'30-36	—	2	74	435	18	8	57	429	123	10	131	864	141
'37-43	—	—	—	—	—	10	87	784	270	10	87	784	270
'46-50	—	—	—	—	—	6	52	808	251	6	52	808	251
'51-57	—	—	—	—	—	7	51	791	89	7	51	791	89
		6	236	1,584	18	69	682	5,728	1,882	75	918	7,312	1,900
Wrecked	—	6	236	1,584	18	65	644	5,451	1,705	71	880	7,035	1,723
Foundered	—	—	—	—	—	4	38	277	177	4	38	277	177
		6	236	1,584	18	69	682	5,728	1,882	75	918	7,312	1,900